

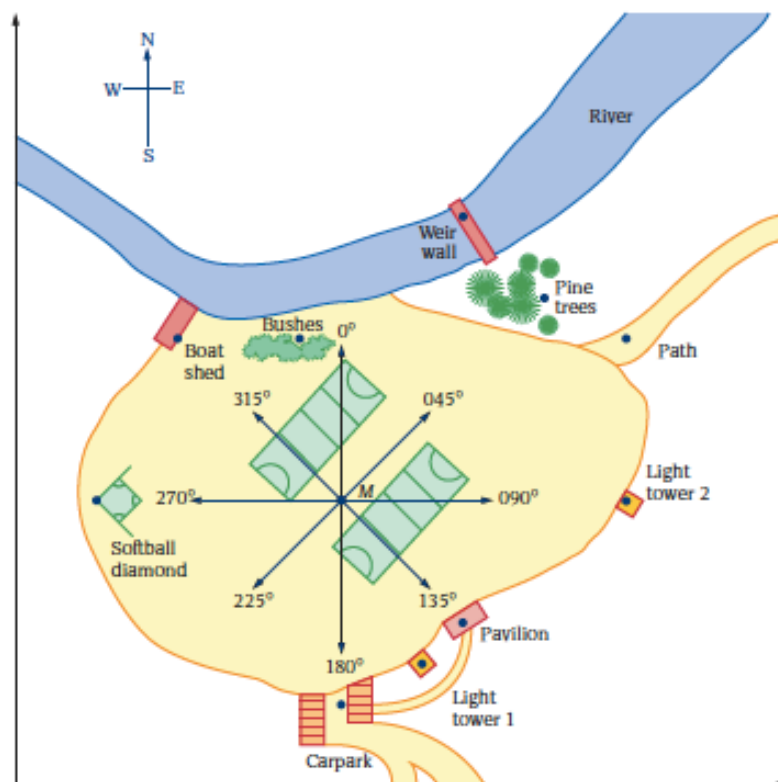
7.10

Position coordinates and directions

The illustration shows Miranda (M) standing at the centre of a large park at the bottom of a hill near a river. She is standing between two hockey fields.

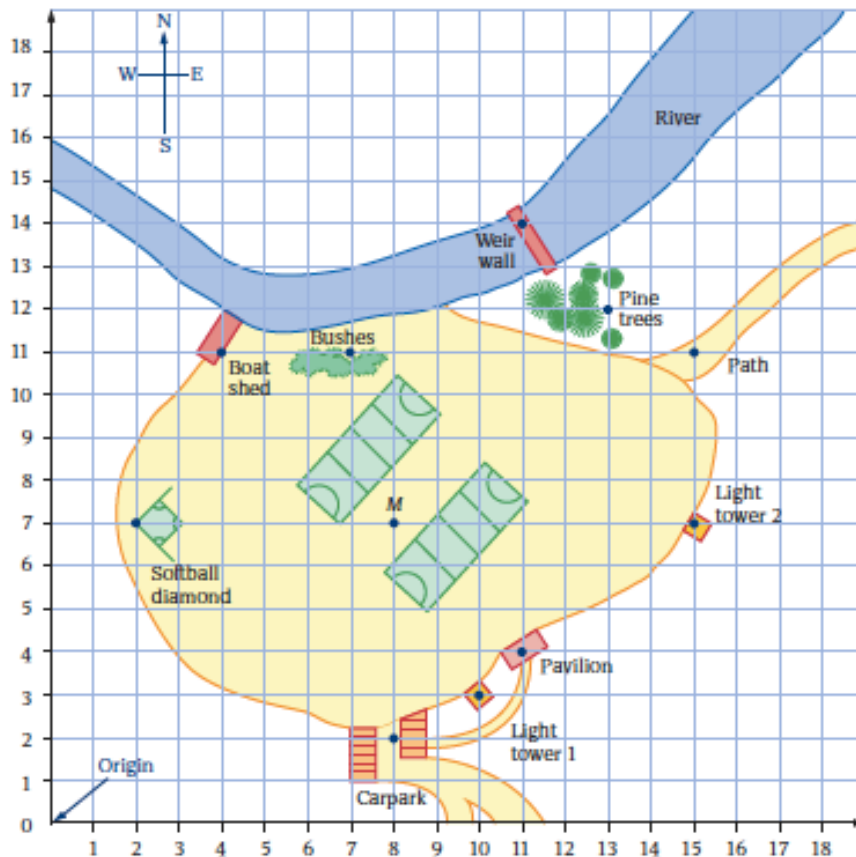


Features on the illustration above can be identified using true bearings or position coordinates. The map below shows Miranda's position compared with other landmarks. The true bearings from Miranda's position to the landmarks are also shown.



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If we place a grid over the map as in the following diagram, each of the features, including Miranda's position, can be identified by position coordinates.



Miranda's position is marked *M*. She is due east of the softball home base and due north of the carpark.

Miranda's position can be named more exactly using the coordinate grid.

A starting point at the bottom left has been marked on the grid. It is called the **origin**, and its **coordinates** are $(0, 0)$. Using this system, the coordinates of Miranda at *M* are $(8, 7)$. This means that Miranda is 8 units across to the right from $(0, 0)$ and 7 units up from $(0, 0)$.

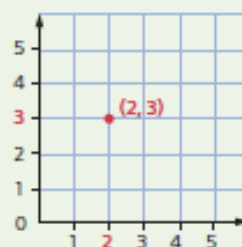


Big Ideas

Coordinate pairs can be used to locate a point on a map.

The point $(0, 0)$ is called the **origin**.

In the coordinate pair, the horizontal distance is always written first, so $(2, 3)$ means 2 units horizontally and 3 units vertically.



Worked examples 7.10 Coordinates and directions

- WE1** When Miranda looks east, she sees the view shown on the right. What landmark is this, and what is its true bearing from Miranda?



Think

Look at the map on page 214.
East is to the right.

Write

Light tower 2
True bearing = 090°

- WE2** Use a protractor to find the true bearing of light tower 1 from Miranda.

Think

Measure the clockwise rotation from north to light tower 1, using the north-south direction for the base line.

Write

True bearing of light tower 1 = 154°

- WE3** What are the position coordinates for the boat shed on the grid on page 215?

Think

The boat shed is 4 units across to the right from (0, 0) and 11 units up from (0, 0).

Write

The coordinates of the boat shed are (4, 11).

Exercise 7.10 Position coordinates and directions

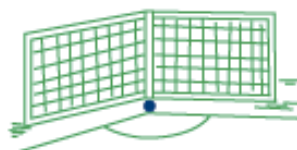
Use the maps on pages 214 and 215 for questions 1 to 7.

- 1** Miranda looks around at the landmarks. Four views that she sees are shown. Identify the landmark in each of the views, and give its true bearing from Miranda.

a



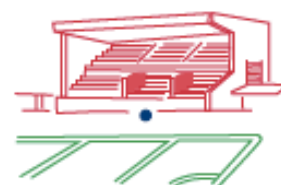
b



c



d



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- WE2** 2 Use a protractor to find the true bearing from Miranda of:
- a the weir wall b the bushes c the path.
- WE2** 3 Suppose that Miranda walks to the home plate of the softball diamond.
- a What is the bearing of light tower 2 from her new position?
- b Measure the true bearing from Miranda now to:
- i the boat shed ii the pavilion
iii the carpark iv the weir wall.
- WE3** 4 Apart from the boat shed, there are nine other landmarks shown on the coordinate map. Make a list of all the landmarks and write the coordinates of the dot marking each landmark.
- 5 Cathy is standing at one of the landmarks. She is due north of the pavilion and north-west of the pine trees. Find where she is on the coordinate map and write the coordinates of her position.
- 6 Marita, Duncan, Susan, Thilinie and Ian are also in the park. Use the information given and refer to the coordinate map to find out where they each are. Give the coordinates of their positions.
- a The carpark is due east of Susan. The boat shed is due north. Where is Susan?
- b Light tower 2 is due south of Ian. Ian is due east of the pine trees. Where is Ian?
- c The boat shed is north-west of Marita and the carpark is due south. Where is Marita?
- d Light tower 1 is south-east of Duncan. Duncan is south of the bushes. Where is Duncan?
- e Thilinie can see the bushes to her west, Miranda due south of her and the weir wall to the north-east. Where is Thilinie?
- 7 The local council prepares a new map of the parklands and decides that the dot marking the carpark will be the origin of the new map. This means that each landmark will have new coordinates. For example, the weir wall will now have coordinates (3, 12), and the bushes will be at (-1, 9). Make a list of all the landmarks and their new coordinates as they will appear on the council map.

Applications and problem solving

8 Hoppers Town

- a On a piece of graph paper, draw a sketch map of some features in Hoppers Town. The distances between the features are not important. Here are some details of the town.
- The bridge over the river is south-west of the town hall.
 - The church is due west of the showground.
 - The town hall is south of Hoppers Square.
 - North-west of the showground is the town hall.
 - The bridge is due north of the railway station.
 - Hoppers Square is east of the bowling club.
 - The bridge is north-east of the church.
 - Due south from the bowling club is the railway station.
- b Compare and discuss your map with others who have tried this problem. Write a short description of any differences you find between the maps, and explain why they occur.

You will need a protractor for questions 2 and 3. Remember to use north-south for the base line.

A negative horizontal coordinate means that the position is left (or west) of the origin.

E Extra
7.10

C Challenge
7.10